said, on his return from Europe, occupy a chair in the newly-established School of Pedagogy in Cornell University, devoting himself chiefly to problems of child-study.

AT the meeting of the Board of Regents of the University of California on April 12th Mrs. Phœbe Hearst offered to construct and equip at her expense a building for the College of Mines.

MCGILL UNIVERSITY has suffered severe losses in the resignation of Professor Hugh L. Callendar, of the chair of physics, and Professor C. A. Carus-Wilson, of the chair of electrical engineering. Professor Callendar has been appointed to the chair of physics in University College, London, vacated by the resignation of Professor Carey Foster.

THE summer session of the University of Nebraska opens on June 6th and closes July 16th. It is to take the place of the University Summer School, hitherto maintained for from two to four weeks each year. Regular University work will be offered in eighteen departments and special work in six or seven more. It is the expectation of the University authorities ultimately to develop the summer session so as to afford opportunities for vacation work along nearly all lines of University study. The sciences now offered are botany, chemistry, entomology, geology, physics and zoology.

DISCUSSION AND CORRESPONDENCE.

ISOLATION AND SELECTION.

TO THE EDITOR OF SCIENCE: Will you permit me to use your pages for protesting against the indiscriminate use of the word 'Selection' by writers on Organic Evolution. Selection means the act of picking out certain objects from a number of others, and it implies that these objects are chosen for some reason or other. Now Selection, by itself, can never originate a new variety or a new species. To do this it must always act in conjunction with the isolation of the selected individuals.

'Artificial Selection,' by which breeders form new races of domesticated animals, consists of two distinct processes. The breeder first selects his animals and then isolates them from those which have not been selected. It is isolation of the individuals which produces the new race; selection merely determines the direction the new race is to take. On the other hand, Isolation is capable of originating new species without the cooperation of Selection. For, if a few individuals of a species become isolated from the others by some physical agency, such as a flood, a drought or a hurricane, and happen to have some peculiarity or variation different from the average of the species, that variation will now have a special chance of being propagated and probably intensified, although the original parents were not selected in any way. The one factor common to all cases of organic evolution is Isolation, and consequently it must be considered as the most important factor.

I have summarized the different ways in which Isolation can be brought about in a paper in *Natural Science* for October, 1897, to which I may be allowed to refer any of your readers who are interested in the matter. Selection implies the action of a Selector outside of the individuals which are selected, whether that Selector be, or be not, conscious of what he is doing; this is the Artificial Selection of Darwin. Natural Selection is not truly selection, for the individuals can hardly be said to select themselves by their superior strength, cunning, or what not. Still the term has become so firmly established that it can well be allowed to pass, if used only in Darwin's sense of advantage gained in the struggle for existence, either by the individual or by the species. It is, certainly, quite as good a term as Organic Selection, and has the advantage of having been proposed by the founder of the doctrine of evolution.

I quite agree with Professor Mark Baldwin and others that Determinate Evolution is the only explanation of the main facts of organic progress. But alongside of this Determinate Evolution a large amount of Indeterminate Evolution has also been going on. For example, although Humming Birds and Diatoms, as groups, are the product of Determinate Evolution, I cannot believe that all the specific characters of the various Humming Birds, or the specific and generic characters of the various Diatoms, are due to the same agency, for they show no definite tendency in any direction, but merely variety.

Now, while we think of all evolution as the result of some kind or other of Selection this remains an enigma. But when we distinguish between the two processes of Isolation and Selection and assign to each its true function we get at once the explanation of our difficulty. Determinate Evolution is due to the combined action of Isolation and Selection. Indeterminate Evolution is due to the action of Isolation alone.

I think that Darwin had this distinction in his mind when he said that Natural Selection was the chief, but not the only, cause of the origin of species. At any rate, it seems to me to embody the whole truth, although Darwin's attention was chiefly devoted to establishing the cause of Determinate Evolution by, what I hope we may still call, Natural Selection.

F. W. HUTTON.

CHRISTCHURCH, NEW ZEALAND, March 1, 1898.

MODERN STRATIGRAPHICAL NOMENCLATURE.

ONE of the most noteworthy features connected with every one of the various branches of the rapidly expanding science of modern geology is a widespread and oft-deplored change in terminology. Old names are discarded, the meanings of others are altered, and a host of apparently useless new ones are proposed.

In no department has the coining of new names gone on more vigorously than in stratigraphical geology. The reason is to be found partly in the naturally favorable conditions that prevail in the field, but largely in the change of base that this branch of science has undergone in late years.

The fundamental conception of the geological formation, whether large or small, whether a great series or a single bed, is a sharply defined 'geological unit' instead of a vaguely bounded 'group' of layers. The former is now clearly distinguished by strictly physical characters that are inherently the direct outgrowth of the actual conditions giving rise to the formations. The latter have been too often based upon trivial or accidental features that are relatively unimportant as critical criteria, either in correlation or classification.

The principle underlying the recent change in the method of naming geological formations gives to each stratigraphical unit a special geographical designation taken from some prominent town, watercourse, or feature of relief, within the boundaries of the formation and where the latter is typically or unusually well shown. As thus established, the formation is a well-defined and independent unit, having a definite position in space, and always an exact relative place in the geological scale, no matter how the latter may be changed afterwards or what method of classification is followed. This definite stratigraphical unit contrasts strangely with the unwieldy, ill-defined and usually little understood large 'group' of the past, the very name of which commonly indicated either a lack of exact knowledge of itself, or a covering-up of almost total ignorance regarding its real affinities.

To be sure, the nomenclature in the field of geology has been greatly increased, even enormously enlarged, by the introduction of the plan. The former list of names numbered only two or three score or so—names of the smallest subdivisions that went to make up the general geological column. The names of the new list run up into the hundreds or even thousands, are different in every region, and additions are constantly being received.

Against this copious multiplication of geological names protests long and loud have gone up these several years past. Still, from time to time, the protestations continue to be uttered. Curiously enough, the struggle, if such it might be called, has been largely reduced to a clash between the practical field geologists on the one hand and on the other the laboratory workers, those especially interested in some particular and limited phase of geology, and the paleontologists who see, in the new scheme, their standard classification scattered to the four corners of the earth and their usefulness in the domains of geology diminished. And the former have manifestly won.

When, a decade and a-half ago, various geological surveys in this country were established or reorganized those intrusted with the work soon found that if speedy and exact results were to be secured—substantial data upon which all other workers could easily build—